Approaches for Archiving and Distributing Science Data from Planetary Missions

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INTRODUCTION

The Planetary Data System (PDS) Geosciences Node, at Washington University, leads science data archiving from NASA's planetary missions to terrestrial planets.

The Geosciences Node has played a leading role in archiving data from about 20 missions over the past two decades.

The Node houses about 100 data sets from these missions and from earth-based observatories.

Based on this extensive archiving experience, we have established standard practices that help enable the production of high-quality science archives.

These practices are the focus of this presentation.

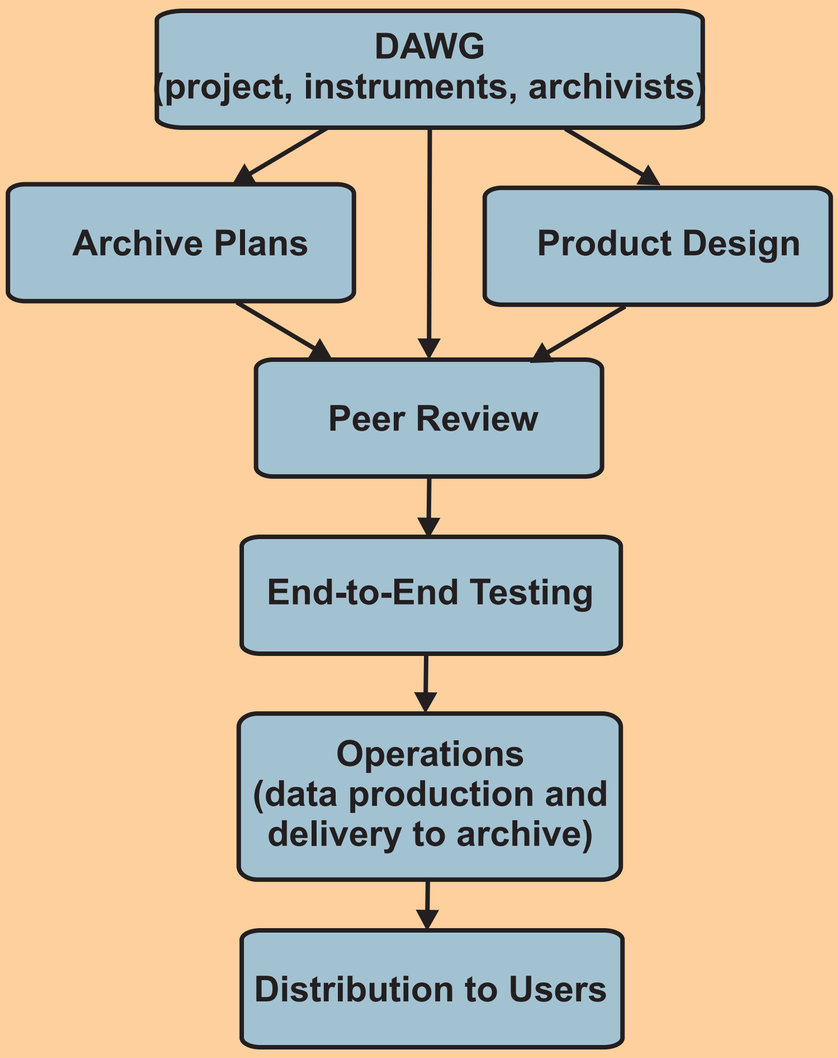
KEYS TO CREATING HIGH-QUALITY SCIENCE ARCHIVES

Begin interfacing with mission and instrument team personnel early in mission development phase.

Each instrument team should have point of contact, who is responsible for working on archive development.

Peer review archive plans and data product designs before development of processing pipeline.

Conduct end-to-end archive delivery tests before mission and archiving operations start.



ARCHIVE DEVELOPMENT PROCESS

Create Data Archive Working Group (DAWG) with personnel from the mission, instrument teams, and archiving system (e.g., PDS).

DAWG develops overall archive plan and schedule and monitors progress of archive development and operations.

Instrument teams with assistance from archivist develop data product design that meets team's requirements and archive standards.

Archive design reviewed by representatives of science community to ensure that archived data are scientifically useful by science community.

Instrument teams build processing pipeline after design complete and reviewed by science community.

DAWG oversees pipeline testing, including delivery to archive.

ARCHIVE DISTRIBUTION AND SERVICES

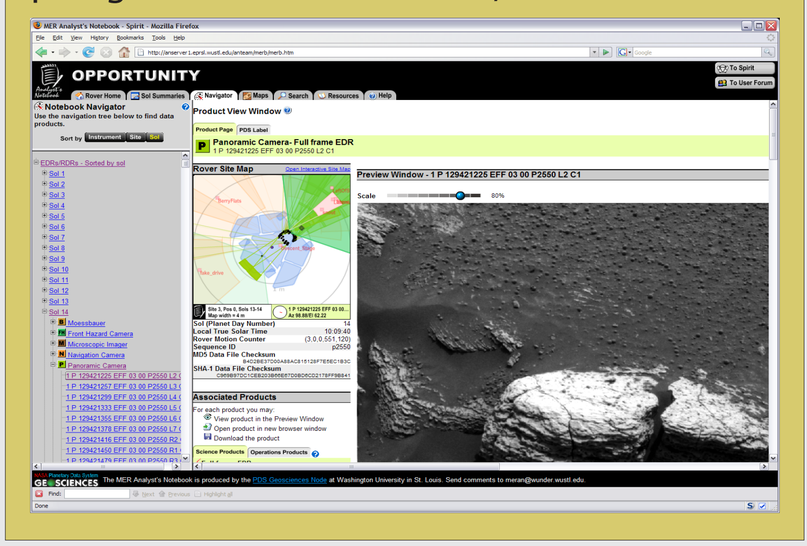
An important consideration in design of science archives is the needs of data users.

Examples of design considerations:
- Users need raw, calibrated, and derived data sets.
- Data should be formatted for seamless import into commonly used software tools.
- Complete and detailed documentation and calibration information are essential.

Interface tools are needed for searching through large data sets or across multiple data sets (e.g., MER Analyst's Notebook, CRISM Spectral Library, and Orbital Data Explorer).

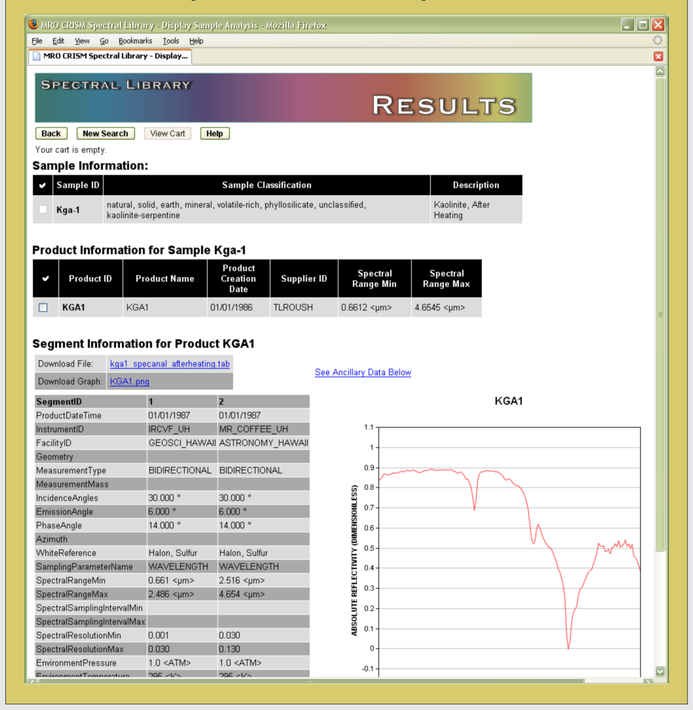
MER Analyst's Notebook

pds-geosciences.wustl.edu/meran



CRISM Spectral Library

pds-geosciences.wustl.edu/missions/mro/spectral_library.htm



GEOSCIENCES NODE USER INTERFACES

The MER Analyst's Notebook provides integrated access to all datasets from the Mars Exploration Rover (MER) Mission, along with information on the science strategy for acquiring the data. The Analyst's Notebook will also be used to access data sets from the future Phoenix lander and MSL rover missions.

The CRISM Spectral Library provides search, visualization, and download capabilities for laboratory spectra of materials relevant to Mars.

ODE provides a capability to simultaneously search databases for multiple instruments and missions for a given planet. The initial version handles Mars data and a version is planned for LRO and other lunar data sets.

Orbital Data Explorer

in development